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From:	Edelberg, Barry Allen
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DOCUMENTS	NUMBER OF PAGES*
1. Amendment, w/executed certificate of facsimile transmission on last page	7
2. *Merriam-Webster WWWebster Dictionary*, at http://www.m-w.com	1
2. page 1251 of *Webster's New International Dictionary of the English Language*, Second Edition, (unabridged), G. & C. Merriam Company, Springfield, Mass., (1939), with title page	2
3. page 988 of the *The Random House College Dictionary*, Revised Edition 1982, with title and copyright page	3

COMMENTS:
In re Application of: Imam et al.
Serial No. 08/845,897
Filed: April 28, 1997
For: POROUS METAL/ORGANIC POLYMERIC COMPOSITES

Atty. Docket No. 77,897

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PATENT APPLICATION
Docket No.: N.C. 77,897

Official
#9

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Imam et al.
Serial No. 08/845,897
Filed: April 28, 1997
For: POROUS METAL/ORGANIC POLYMERIC COMPOSITES

Examiner: B. Copenheaver
Group Art Unit: 1771

April 15, 1999
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RESPONSE AFTER FINAL REJECTION

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

This communication is responsive to the Office Action of January 16, 1997.

Claims 1 through 4, 11, 17, 19, and 22, have been rejected under 35 U.S.C. §102(b) as anticipated by Jarema et al '401. The Examiner states that Jarema et al. '401 discloses a metal foam, such as an Al or Al-alloy foam, having open cells, which is impregnated with an organic material, such as an epoxy. The Examiner adds that the metal foam can contain cells which are of equal sizes. This rejection is respectfully traversed.

The January 16, 1997 final rejection dismissed Applicants arguments that Jarema et al. '401 fails to disclose impregnation as defined on page 669 of *The Random House College Dictionary*, Revised Edition 1982. The final rejection stated that Applicant's specification, by allowing cells of the impregnated open-cell metal foam to be partially filled with a polymer, defines impregnation of a metal foam in different manner than the ordinary dictionary definition. Also, the final rejection

states that "it is well known that Figures 1-3 of Jarema show an impregnated foam." The final rejection also equates seepage of foam into surface cavities with impregnation of a foam. Each of those positions is incorrect.

Page 669 of *The Random House College Dictionary*, Revised Edition 1982, definition 3, defines *impregnate* as "to cause to be infused or permeated throughout, as with a substance; saturate". Initially, Applicants note that the semicolon between the first and second portions of definition 3 denotes these definitions as separate but related rather than identical. Thus, *The Random House College Dictionary* does **not** require "impregnate" to be synonymous with "saturate". As further evidence that "impregnation" does not require saturation, Applicants reference the enclosed page from the *Merriam-Webster WWWebster Dictionary*, at http://www.m-w.com, which defines, in definition 1a, "impregnate" as "to cause to be filled, imbued, permeated, *or* saturated" (emphasis added). Also, the enclosed page 1251 of *Webster's New International Dictionary of the English Language*, Second Edition, (unabridged), G. & C. Merriam Company, Springfield, Mass., (1939), definition 2, defines "impregnate" as "To infuse particles of another substance into; to cause to be filled, imbued, mixed or furnished (with something); to saturate; interpenetrate; as to *impregnate* India rubber with sulfur; clothing *impregnated* with contagion (emphasis original). Note that in *Webster's New International Dictionary of the English Language*, the semicolon delimiter between "to saturate" and "interpenetrate" obviously denotes that those definitions are separate but **related**, as no reasonable person would equate "interpenetration" with "saturation". Accordingly, Applicants'

use of the term "impregnate" to include the partial filling of cells within a foam (i.e., cells may include a mixture of gas and/or void space, as can occur when the cells of an open-cell metal foam are filled with a polymer solution that evaporates before solidification of the polymer (*see* page 8, lines 8 through 14 of the specification as filed)) is consistent with its dictionary definition. Significantly, under none of the definitions for "impregnate" does the surface coating of Jarema et al. '401 impregnate the substrate.

Moreover, the instant specification clearly uses the term "impregnate" in the sense of "permeate" and "interpenetrate". The paragraph bridging pages 7 and 8 of the specification as filed states:

> Typically, the metal foam is *impregnated* by contacting it with a resin component. The resin component may be a neat resin or a neat blend of resins, or may include any catalysts, curing agents, or additives desired. The resin component may be a powder (of sufficiently small particle size to *penetrate* the pores of the metal foam), a melt, a room temperature liquid, or a solution, and may include mixtures of several prepolymers and/or monomers. A vacuum or positive pressure may be applied to assist the *penetration* of the resin component into the metal foam.

(Emphasis added.) Page 8, lines 20 through 24 of the specification as filed states:

> Preferably, the *impregnant* viscosity should be selected to allow the metal foam to be completely impregnated with the resin component under practical processing conditions. A high impregnant viscosity may restrict the ability of the resin component to completely *penetrate the open porous structure* of the metal foam. This problem may be overcome by forcing, under positive pressure, the resin component into the pores of the foam.

(Emphasis added.) That same paragraph goes on to state:

> Resin component in powder form can be forced into the pores of the metal foam by any method. For example, the powdered resin component may be poured on top of the metal foam, and positive or negative pressure may be applied to the powder, forcing it into the pores of the foam. At the same time, the metal foam may be vibrated to aid in impregnation.

From these passages, a person skilled in the art would recognize that Applicants are using the term "impregnate" in the sense of penetration and permeation, i.e., "to penetrate through the pores, interstices, etc., of" (*The Random House College Dictionary*, Revised Edition 1982, page 988, *enclosed*). Nothing in the instant specification suggests that the term "impregnate" includes the mere surface coating achieved in Jarema et al. '401. Rather than impregnating the substrate, the surface coating of Jarema et al. '401 simply fills in cavities on the upper surface of a closed cell foam, much like a wax coating on a pitted surface. Nothing in Jarema et al. '401 discloses or suggests impregnation of a metal foam.

No support has been cited for the proposition, set forth on page 5 of the January 16, 1999 Final Rejection, that "it is well known that Figures 1-3 of Jarema show an impregnated foam." Section 2144.03 of the M.P.E.P. requires the Examiner to cite a supporting reference in the event an applicant traverses an Examiner's assertion that a matter is "well-known". Applicants hereby request the Examiner to document the assertion that "it is well known that Figures 1-3 of Jarema show an impregnated foam."

The assertion that "it is well known that Figures 1-3 of Jarema show an impregnated foam" rests upon incorrect definitions of the terms "impregnate" and "open-cell foam." As shown above,

the term "impregnate" requires more than the mere filling of cavities on the surface of a foam as disclosed by Jarema et al. '401. In Figs. 1 through 3 of Jarema et al. '401, only the pores/voids directly on the surface are filled by the coating. No pores below the exposed surface layer are even partly filled. Reading the term "impregnation" as encompassing this mere surface phenomenon would conflict with the accepted defination of that term. Instead, as explained above, impregnation requires penetration through pores and interstices of the foam that have their openings situated beneath, rather than at, the surface of an open cell foam. Of course, in Jarema et al. '401, which is a closed cell foam, such penetration cannot and does not occur and is not shown in the figures.

As stated in Applicants' earlier responses, an assertion that Jarema et al. '401 discloses an open cell foam conflicts with the definition of an open cell foam. Contrary to the assertion, made on page 5 of the January 16, 1999 final rejection, that "an open-cell foam is a foam that contains open cells", the art defines an open-cell foam as a foam having "a large fraction of open cells" (page 566 of the previously submitted *Encyclopedia of Polymer Science and Engineering*, Vol. 3, John Wiley & Sons, Inc., New York (1985)). Figures 1 through 3 of Jarema et al. '401 do not suggest that their coated foams have a large fraction of open cells. If anything, figures 1 through 3 of Jarema et al. '401 suggest that their foam has a large fraction of closed cells and is therefore a closed cell foam (*see* page 566 of the *Encyclopedia of Polymer Science and Engineering, id.*, for the art-recognized definition of a closed cell foam). An Examiner may not substitute his or her own definition of a term for one that is well-recognized by the art. Reconsideration and withdrawal of this rejection are respectfully urged.

Claims 18 and 21 have been rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious from Jarema et al. '401. The final rejection states that with regard to claim 18, Figs. 1 through 3 of Jarema et al. '401 appear to show a gradation of pore sizes with respect of the thickness direction and that Jarema et al. '401 discloses that the cells can be of different sizes. With regard to claim 21, the final rejection states that selecting the foam thickness to be no less than three time the average diameter of the cells is either disclosed in Fig. 2 of Jarema et al '401 or is an obvious optimization thereof. This rejection is respectfully traversed for the reasons stated above with respect to the rejection of claims 1 through 4, 11, 17, 19, and 22, under 35 U.S.C. §102(b) as anticipated by Jarema et al '401.

Also, as shown in Fig. 2 of Jarema et al. '401, the upper pores of the surface of Jarema et al.'s foamed metal are at least as large as those shown in the middle and bottom sections of the foam. The illusion that Fig. 2 shows gradation of pore sizes with thickness arises is possible only if one improperly discounts the pore sizes at the top and bottom surfaces of the foam. If the pore sizes shown at the top and bottom surfaces of the foamed metal are taken into account, the pore size distribution in Fig. 2 is random. Finally, Jarema et al.'s teaching that the cells can be of different sizes does not specify a gradation of pore sizes instead of a random distribution of pore sizes. Reconsideration and withdrawal of this rejection are respectfully urged.

In conclusion, the present claims are submitted to define patentable subject matter. Favorable reconsideration and allowance are earnestly solicited.

Application Serial No. 08/845,897
Applicant(s): Imam et al.

PATENT APPLICATION
Docket No.: N.C. 77,897

Kindly charge any additional fees due, or credit overpayment of fees, to Deposit Account No. 04-0814.

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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being transmitted to the Patent and Trademark Office on the date shown below.

Barry A. Edelberg
Reg. No. 31,012

April 15, 1999